

## Well Decommissioning – Interim DOCUMENTATION

### I. Reference Materials

The following reference materials will be used to plan, design, and complete the sealing of abandoned wells:

- a. Section IV, Technical Guide, Interim Practice Standard Sealing Abandoned Wells.
- b. North Dakota Construction and Material Specifications for Conservation Practices.
- c. Federal, State, and Local Regulations.

### II. Preliminary Investigation

The following is a list of items to be determined:

- a. Present well owner and address
- b. Reason for abandonment & date of abandonment
- c. Type of well
- d. Well location (locate on map Form ND-ENG-IO)
- e. Well installation report if available. Obtain copy.

### III. Survey Data Required

- a. Total well depth
- b. Casing diameter
- c. Casing depth
- d. Depth to water
- e. Well type
- f. Casing material

### IV. Design

The well sealing will be completed according to Interim Specification, Sealing Abandoned Wells, Section IV, Field Office Technical Guide.

1. Retaining a certified water well contractor to seal wells should be considered. These professionals are familiar with current procedures, knowledgeable about wells, and have access to necessary equipment. If a certified water well contractor is not used, NRCS inspection will be required.
2. Complete Form ND-ENG-10. Provide information on construction and condition of well; location; list obstacles that need to be removed before sealing the well and method of sealing to be required.

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3. Estimate quantities and cost. Table I provides a quick method to estimate bentonite requirements. To calculate the volume of a well or drill hole to determine quantities, use the following equation.

$$v = 3.14 r^2 h = \text{volume in cubic feet}$$

$r$  = radius of well (in feet)  $h$  = well depth (in feet)

**Table I**  
METHOD FOR DETERMINING THE NUMBER OF 50  
LB. BAGS OF CHIPPED BENTONITE TO FILL A WELL  
HoleSize and Volume Table

Hole Dia. Inches	Hole Volume Bentonite to (ft <sup>3</sup> /foot)	Pounds Chipped Bags Chipped Bentonite	Feet Filled By One Bag	
		To Fill 1 Ft	Chipped Bentonite	fill 100 Ft.
4	0.087	6.3	7.9	12.6
4-1/2	0.110	7.9	6.3	15.8
5	0.136	9.8	5.1	19.6
5-1/2	0.165	11.9	4.2	23.8
6	0.196	14.1	3.5	28.2
6-1/2	0.230	16.6	3.0	33.2
7	0.267	19.2	2.6	38.4
7-1/2	0.307	22.1	2.3	44.2
8	0.349	25.1	2.0	50.2
8-1/2	0.394	28.4	1.8	56.8
9	0.442	31.8	1.6	63.6
9-1/2	0.492	35.4	1.4	70.8
10	0.545	39.2	1.3	78.4
11	0.660	47.5	1.1	95.0
12	0.785	56.5	0.89	113.0
15	1.227	88.3	0.57	176.6
18	1.767	127.2	0.39	254.4
20	2.182	157.1	0.32	314.2
24	3.141	226.1	0.22	452.2
36	7.068	508.9	0.10	1017.8

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Some sources of commercial bentonite are:

HOLEPLUG	N.L. Baroid, Inc. (3/8" and 3/4" chips)
VOLCLAY CHIPS & PURE GOLD CHIPS	American Colloid Co. (Both coarse 1/4" to 3/8") chips and medium chips (3/8" to 3/4") Northwest Pipe Fittings Inc., Mandan, ND (wholesale only)
ENVIROPLUG	Wyo-Ben, Inc. (Both coarse chips: 3/8" to 3/4" chips and medium chips: 1/4" to 3/8")
TOWER PLUG	Black Hills Bentonite Co. (3/8" and 3/4" chips)
WELL PLUG	Fluidril Mud Systems (3/8" and 3/4" chips)
PDSCO PLUG	PdsCo. (Polymer Drilling Systems) (Medium and Coarse Chips)
PERMA PLUG	Cathodic Engineering Equipment Co. (Both medium - 3/8" & coarse - 3/4" chips)
ECONOPLUG	Economy Mud Products Co. (Both coarse - 1/2" to 3/4"; and medium 1/4" to 3/8" chips) (Mfg. by Wyo-Ben, Inc.)

### V. Construction Plans and Specifications

The cooperators, contractor, and cooperators' file will be provided Form ND-ENG-10 and the specifications for sealing the well.

### VI. Well Sealing Procedures

- a. Remove pump, piping, and any other material obstructions in the well or drillhole that could prevent complete filling.
- b. Fine particles contained in the bentonite chips must be removed. This is done by pouring the bentonite chips from the bag such that they tumble down across a coarse-mesh screen 2 to 3 feet in length. The screen should be formed into a U-shape like a rain gutter. One end of the screen should be placed on the top of the well casing while holding the other end of the screen at an angle. Removal of the dust prevents bridging of the material at the water table.

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- c. Make sure the well "accepts" the entire number of bags or volume of material calculated to fill it. If it doesn't, bridging has occurred. The point of bridging must be broken so the material will fall to the bottom. A poorly sealed well will have greater potential for ground water contamination than one that is sealed properly. Once a well is filled, it is very difficult to correct subsurface problems caused by inadequate sealing.

### VII. Compliance Checking

- a. Check all quantities.
- b. Contractor certification on installation will be accepted from certified well drillers.
- c. Installation by persons other than certified well drillers will require on site inspection by the NRCS employee.
- d. NRCS employee with appropriate approval authority will need to sign Form ND-ENG-10, Sealing Abandoned Wells Data Sheet, certifying completion and quantities.
- e. The as-builts will be the Form ND-ENG-10.